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ABSTRACT

Designed to provide guidelines for the development of computerized student information systems, this report raises policy issues and questions to be resolved at the campus level and describes a variety of computer-generated reports and records that can assist in educational decision making and planning. Introductory material discusses the importance of human communications and cooperation in machine-oriented systems, the benefits of computer use, and the difficulties in providing definitive answers to system design questions. The next sections look at components of the student information system, focusing on student admissions; assessment, advising, and counseling; student registration; academic alert monitoring; degree audit; transfer program requirements; and student follow-up. Each section provides a definition of the component, enumerates purposes and policy issues, and lists the reports that may be part of the component and the data elements required to generate the reports. Following a discussion of hardware considerations, the report offers predictions for the future, suggesting special projects and ideas for development in the areas of assessment, advisement, and counseling; registration; progress monitoring; follow-up; and artificial intelligence. Concluding comments offer recommendations for developing and using computer-based information systems. A matrix showing relationships among student information systems and input data and a selected list of references are appended. (LAL)

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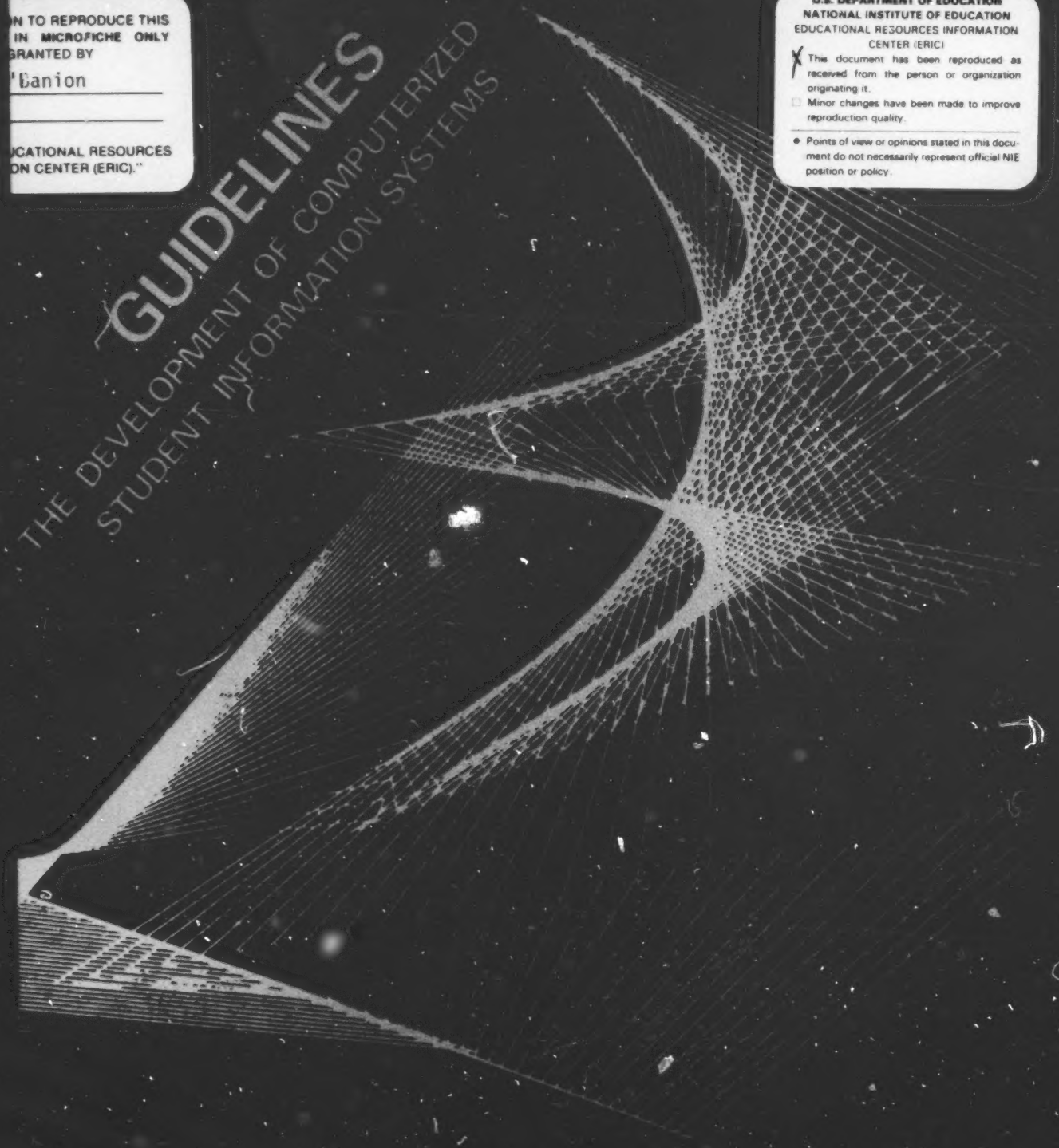
GUIDELINES

THE DEVELOPMENT OF COMPUTERIZED STUDENT INFORMATION SYSTEMS



THE LEAGUE FOR INNOVATION IN THE COMMUNITY COLLEGE
IN COOPERATION WITH
AMERICAN COLLEGE TESTING PROGRAM • MAC • THE COLLEGE BOARD
DIGITAL EQUIPMENT CORPORATION • INFORMATION ASSOCIATES
MIDWEST SYSTEMS • ROCKY MOUNTAIN BBROUGHS

GUIDELINES FOR THE DEVELOPMENT OF COMPUTERIZED STUDENT INFORMATION SYSTEMS

PREPARED BY THE LEAGUE FOR INNOVATION
TASK FORCE ON COMPUTERIZED STUDENT INFORMATION SYSTEMS

NANCY ARMES, JEAN SHARON GRIFFITH, LEE TROUT, EDITORS
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LAGUNA HILLS, CALIFORNIA
OCTOBER, 1984

THE LEAGUE FOR INNOVATION TASK FORCE ON
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PREFACE

On February 6-8, 1984 in Scottsdale, Arizona, the Maricopa Community Colleges and the League for Innovation in the Community College sponsored a National "Working Conference on Student Information Systems." We knew we were on to something important at the Scottsdale Conference when we had to turn people away because there was no more space available. We began to understand the magnitude of the challenge when a participant approached the Conference staff and indicated that her president had ordered six microcomputers and had sent her to the Conference to learn how to set up a computerized student information system that was to be in place by the fall semester.

In the yeasty environment of the Conference, an idea began to grow, and by Conference end a skeletal structure had formed to nurture the idea along. The League for Innovation created the National Task Force to design "Guidelines for the Development of Computerized Student Information Systems." Seven League colleges, four computer corporations, The College Board, and the American College Testing Program provided representatives for the Task Force. Ron Bleed, Director of Computer Services for the Maricopa Community Colleges, served as the Task Force Chair.

The Task Force met in Phoenix, Dallas, Washington, D.C., and Napa, California, throughout 1984. Because of the range of activities related to student information systems, the Task Force agreed to limit the guidelines to the most important areas of admissions; assessing, advising, counseling; registration; progress monitoring; and follow-up. Teams were formed for each area, and members developed drafts of guidelines which were reviewed and redrafted a number of times by other members of the Task Force. The various perceptions and experiences of community college practitioners, computer corporation staff, and educators from ACT and The College Board made for lively and rich discussions.

The final set of guidelines is a healthy piece of work because it represents the expertise and insights of some of the best people in the field today. It is also a frail piece of work, because it was constructed by a committee and at a time in our educational history where there are few well-designed and extensively tested computerized student information systems.

As a first step, however, the guidelines should have considerable value to those community colleges, and possibly four-year colleges and universities as well, computer corporations, and other groups and agencies that are beginning to design new systems to assist students to move more gracefully through our institutions.

The League for Innovation is most pleased to have sponsored this National Task Force, and on behalf of the Board of Directors it is my honor to extend our appreciation to Ron Bleed for his outstanding stint as Chair; Nancy Armes, Sharon Griffith, and Lee Trout for the keen quality of their editing and the swiftness of their responses; and the other members of the Task Force for their perseverance, their insights, and their very cordial support. Because of this joint effort, community colleges will design better student information systems, and community college students will be the beneficiaries for years to come.

October, 1984

Terry O'Banion
Executive Director
League for Innovation in the Community College

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INTRODUCTION

This report has been prepared by a team of community college personnel and representatives of the businesses and organizations that support the use of computerized student information systems.

The purpose of the report is to provide guidelines for the development of student information systems, including:

- to raise policy issues and questions which need to be resolved at the campus level before programs can be purchased, adapted or developed,
- to describe a variety of computer-generated reports and computer-based records that can assist students and staff in educational decision-making and planning,
- to provide a matrix that shows the relationships among student information systems and input data,
- to list resources for information and assistance.

Like the computer industry itself, the application of computer technology on the campus is growing rapidly. In 1968, a survey by the American Association of Collegiate Registrars and Admissions Officers revealed only 12 computerized degree audit applications throughout the country. A repetition of the survey in 1980 showed an increase to 132 such applications. A survey made today would probably show an even greater rate of change.

But few colleges have made full use of the tremendous potential of the computer to assist with educational recordkeeping and planning.

The Fear of De-Humanization

The human values of empathy, understanding, personal attention, and respect for diversity and creativity can be threatened by careless over-reliance on technology. But machines can also free people from machine-like, rote tasks so that they can communicate directly and personally with each other.

A high degree of reliance on technology requires a high level of commitment to developing and maintaining human communications and cooperation skills. Reliance on technology should not be absolute: while programming may be sophisticated enough to respond to a great majority of the problems and alternatives possible, the variability of human nature and experience will always produce exceptions that merit a unique response. As machines handle more of the routine information exchange, people will be able to devote their time to unique problems, special conditions and the individual differences of our students.

Benefits of Computer Use

Failure to take advantage of the power of the computer to store, retrieve, and analyze accurately and quickly vast quantities of data can be a disservice to students. Because of its power, the computer can provide options and calculate probabilities for use in decision-making. It can track student performance and prescribe highly individualized plans of action. Unlike paper-based information, electronic sources of information can be updated quickly and easily.

Because of its power, the computer can collect and analyze the statistical information of entire populations, eliminating the problem of sampling error in research. As data bases grow and become more familiar, educational decisions can be better informed and based on a broader range of options.

Our progress toward full use of the advantages offered by the computer has been slow. It is time to collect the experience and programming knowledge of our leaders in the development of student information systems, and to share this knowledge.

Problems

The language and vocabulary of the student personnel (student services? student development?) field is not uniform. There is no single predominant structure, set of definitions, model, or theory. The field of electronic data processing and communication is newer, and even less consistent. The Task Force recognizes that our decisions regarding terminology, priority, and direction will not be indisputable. Through debate and in the spirit of cooperation, we accepted definitions and made assumptions that may seem arbitrary.

Because the report is based on the work of a team of writers, it has the inevitable problems of redundancy and omission that result from the effort to aggregate and condense. This report is not considered a final plan or a definitive prescription. It is a snap-shot of the summer, 1984 stage of development in computer-based student information systems for community colleges.

Just as there is not a single best answer to the question, "What hardware should I buy?," there is not a single program or system that fits every campus. Colleges will have different answers to the policy questions that must form the philosophical base on which programming decisions rest. In each of the sections presented, some of the critical policy issues are raised in the form of questions. The development or adaptation of computer programs can take place only after these questions are answered, and the answers should vary according to the unique needs and nature of the college. Chapter VIII reviews issues related to hardware and software questions. Chapter IX addresses possibilities for the future—possibilities that we see dimly, but that tantalize us as we learn more about the rapid developments in computer technology and applications.

STUDENT ADMISSIONS

I. INTRODUCTION

A. Definition

The Student Admissions component is that portion of a student information system which initiates and manages inquiries, collects the initial demographic characteristics of students, predictors of success such as test scores, evaluations, calculated indices, and previous institutional achievements.

Within the admissions process, there is also a student records monitoring function which advises students regarding the completion of applications and supporting documents. The monitoring function is also used to encourage application from within the prospect pool and to evaluate previous admission strategies in terms of entering class quality and quantity.

B. Purpose

The purposes of the Student Admissions component are:

1. To identify prospective students.
2. To provide the prospective student with information needed to complete the admission process.
3. To provide the student with information about specific programs, services, and requirements.
4. To provide the student with information about status regarding admission.
5. To provide college staff with information needed during academic advisement and counseling.
6. To provide the college with information about the educational background, goals, and skills of students for use in program planning.
7. To provide the college with information about prospective students who do not register after inquiry or application.

C. Policy Questions

1. What are the standards of admission to the college? to specific programs or courses?
2. If enrollment in a course or program is limited, how will students be selected? by earliest application date if basic requirements are met, or by selection on the basis of highest qualifications?
3. How will the admission policies affect recruitment? geographically? ethnically? age/sex?
4. How will the admissions policies affect advertising methods and targets?
5. What kinds of follow-up activities should be developed? targets? costs? evaluation of efforts?

II. OUTPUT

The following reports may be part of the Student Admissions component:

A. Prospective Student Lists

List of students by interests or demographic category.

Provided to college staff for use in targeted recruitment, such as geographic location, veteran status, program of interest, etc.

Provided on request.

Print format or mailing label.

B. Applicant Profile

General biographic and demographic information about individual applicants.

Provided to college staff for use in academic advising or counseling.

Provided on request, typically during pre-registration advisement.

On-line or print format.

C. Student Characteristics

Information about characteristics of groups of students, such as average test scores of students enrolled in specific courses or programs, or number of applicants meeting admissions standards from a specific high school, or number of music students enrolled in evening courses, etc.

Provided to college staff for use in planning recruitment, assessment, curriculum, and program activities.

Provided on request.

Print format.

D. **Comparative Enrollment Report**

Comparison of biographic/demographic data of applicants who do not complete registration to those who enroll.

Provided to college staff for targeting recruitment.

Provided on request or immediately following a registration period.

Print format.

E. **No-Show Lists**

Names of prospective students who made an inquiry about admission but did not apply, or names of applicants who failed to complete registration.

Provided to college staff for follow-up recruitment activities, such as periodic mailings, phone calls, high school recruitment meetings, etc.

Provided on-request. Follow-up letters may be generated automatically if an application is not received after specified length of time after the initial inquiry.

Print format and/or mailing labels.

F. **Individual Admissions Report**

Evaluation of individual application status, requesting additional documents and information from the student, or generating a letter to the student which confirms admission and provides individualized information about orientation testing, advisement, and registration schedules and requirements.

Provided to the student.

Provided upon receipt of the student's application.

Print format (letter) and on-line query of individual student record.

III. **DATA ELEMENTS**

Data elements required to generate the previously noted outputs/reports are:

Name
Address
ID Number (SSN)
Telephone Number
Major/Program of Interest
Goal Intent
Potential Enrollment Time
Special Interests and Recognitions
Previous Educational Background (High School and College)
Financial Aid Interest
Veteran Status
Sex
Native Language
Citizenship
Birth Date
Senior Citizen Information
Recruitment Method
Additional Information to be Sent to Student;
i.e., Financial Aid benefits, Programs, etc.
Ethnicity
Residency Information
High School Graduation/GED
Student Status/Entry Status
Term Applied For (for multiple term registrations)
Emergency Information
Special Needs (i.e., handicapped, child care)
High School and Previous College Information
Type of Financial Aid Requested
Status of Each Document (i.e., received, with dates)
Correspondence Sent to Student Referencing Documents with Dates

ASSESSMENT, ADVISING, AND COUNSELING

I. INTRODUCTION

A. Definition

The Assessment, Advising, and Counseling component should be an integrated college function.

Assessment determines basic skill levels, personal skills, study skills, values, goals, cognitive styles, etc., using both tests and interview processes, intended to gather information predictive of student success.

Advising and counseling include course advisement and program planning; referral to appropriate services; student monitoring and intervention; orientation to the campus; continuing services such as transfer seminars, financial aid, career exploration, etc.

Advising and counseling, though closely related, are two separate functions. Counseling is more often done by a professional counselor. Advising may be done by peers, faculty, or counselors.

B. Purpose

The purposes of the Assessment, Advising, and Counseling component are:

1. To provide the student a way to identify and review personal information that is often related to college success.
2. To provide the student information necessary for making decisions about course/curriculum selection.
3. To provide the student orientation that includes:
   - A welcome to the campus
   - Reinforcement of planning for successful completion of college goals
   - Information about campus resources.
4. To provide instruction information that can be used in developing class schedules.
5. To provide the counselor/advisor with relevant student background, plans, needs, skills, and goals information.
6. To organize information to facilitate student and staff attention to student success factors.
7. To provide student summaries for resource planning and development as well as curriculum planning.
8. To identify patterns of enrollment and student characteristics and needs in order to develop supportive strategies.
9. To contact non-registrants and drop or stop outs.
10. To monitor and evaluate procedures and support activities.

C. Policy Questions

1. Will assessment be mandatory for all students—day, evening, part time, full time, ESL, handicapped, off-campus locations, in-plant training?
2. Will assessment information be used in courses not devoted to basic skill development?
3. Will assessment instruments be standardized at college, district, or state level?
4. Are there sufficient counselors/advisors?
5. Who will set course requirements—faculty, administrators or counselors?
6. How can information be shared in a timely fashion?
7. How many basic skills sections will be needed if placement is mandatory?
8. Who determines cut-off scores (or ranges of scores)?
9. May students challenge their scores? What is the appeal process?
10. Other than reading, writing, and numerical skills, will more advanced levels be assessed? Used for placement?
11. Who will have access to assessment scores?
12. Who does advising/counseling? How often?
13. Are course "recommendations" mandatory? Is there an appeal process?
14. How do continuing students reenter the advising process?
15. How will staff be trained?
16. What resources are needed for monitoring?
17. Who will receive which reports?
18. How can data be protected from inappropriate use?
19. Which students receive follow-up services?
20. Who provides follow-up?
21. Are referral services available?
22. Who conducts assessment research and on what schedule?

II. OUTPUT

The following reports may be part of the Assessment, Advising, and Counseling component:

A. Assessment Information

A frequency distribution of scores of all assessment instruments based on national, state, district, campus norms.

Provided to administration, faculty, counselors to assist with course scheduling, changes and with monitoring course prerequisites.

Provided daily during assessment, at the beginning of the registration period, and at the end of the registration period.

Print format and/or on-line.

B. Course Selections

List of students showing name, address, phone number, Social Security number, major, intent (reason for being at the college), course list.

Provided to counselor/advisor to verify proper selection.

Provided daily.

Print format, automatic mailing to students who have made inappropriate choices.

C. Educational Planning Form

Responses to questions regarding ESL, major, goal, hours planned to work, amount of education planned, transfer intent, reason for attending the current term, perceived needs, assessment scores, and recommended courses.

Provided to the student and counselor/advisor during the advisement portion of orientation.

Provided during the mandatory orientation and at times when there is a change made in the data base, i.e., change in major.

Print format and on-line.

D. Student Description Report

Student listing by selected categories such as: major, financing education, major/career choice, intent to transfer, probation, etc.

Provided to counselors, program coordinators, and, when an appropriate release is signed, to senior college personnel for the purpose of referral or identifying students for services, scholarships, transfer activities, etc.

Provided on request.

Print format, mailing labels, or electronic mailing.

E. End of Semester Review

A "picture" of student progress from term to term with student information on major, goals, relevant assessment scores, course and grade patterns, student perceived needs, and how the needs have been (or have not been) met.

Provided to counselor/advisor to verify student progress; receipt of services; need for services; job; when selected, transfer college probation; hours worked; current and cumulative GPA.

Provided at the end of each term.

Print format and/or on-line.

F. Intervention

A listing that indicates, from factors such as age, scores, hours worked, ESL, date assessed, no major listed, etc., those students who could be expected to drop-out or have some difficulty completing the term.

Provided to counselor/advisor.

Provided as required.

Print format.

G. **Recruit Pool**

A listing of students who:
- Applied but did not complete assessment
- Enrolled but did not complete a term
- Enrolled, completed one or more terms, but did not complete stated goal.

Provided to the person responsible for recruitment.

Provided at an appropriate time prior to the start of the term.

Print format.

H. **Course Success**

By course, a comparison of grades earned to scores made on an appropriate skills assessment, such as grades earned in Freshman Composition compared to scores made on Language Usage or grades earned in Accounting I to scores made on Numerical Skills. This information can be used to reassess cut-off scores and/or student placement and as an advisement tool.

Provided to counselors/advisors, instructors, and administrators.

Provided at the end of each term.

Print format.

I. **Articulation**

A program that, by transfer college, identifies:
- Location and general campus information
- Student services, housing, fees, etc.
- All majors and programs offered
- A degree audit
- A bulletin board for deadlines and other announcements.

Provided to anyone.

Provided at any time using terminals.

Print format and on-line.

III. DATA ELEMENTS

Data elements required to generate the previously noted outputs/reports are:

- Name
- Address
- ID Number (SSN)
- Major/Program of Interest
- Telephone Number
- Goal Intent
- Veteran Status
- Disability
- Native Language
- Citizenship
- ACT/SAT Scores
- Assessment Test Scores
  - Reading, Writing, Math
- Previous Courses Completed and Grades Earned
- Courses Currently Enrolled In
- Instructors for Current and Previous Courses
- High School Graduate
- Date of High School Graduation
- GED (Date and State of Conferral)
- High School GPA
- Name of High School Attended
- College(s) Attended

- Major
- Number of Hours Earned
- GPA
- Courses Completed and Grades Earned

Enrollment Plans
- Day or Evening (or both)
- Full time or Part time
- Degree or Certificate Desired
- Transfer Plans

Employment Status
- Name of Employer
- Work Hours Per Week
- Job Title

Information on Institutions to Which Students Transfer (i.e., area institutions, institution which receives most transfers, etc.)
- Location and General Information
- Student Services, Housing, Fees, etc.
- Majors and Programs Offered
- Courses Required
- Electives Accepted
- Equivalencies

Articulation Agreement

Current Deadlines, Activities, and Other Information

STUDENT REGISTRATION

I. INTRODUCTION

A. Definition

The Student Registration component is the process used to enter the student into a course(s) which leads to the attainment of the student's educational goals, including, but not limited to, the attainment of an academic degree offered by the college.

This registration process is designed for credit students but may be applied to non-credit registration as well.

Registration generally includes:

Advance Registration - takes place well in advance of the beginning of classes. Continuous Processing in advance registration schedules a prospective student and offers individual attention. Batch Processing in advance registration holds a number of student requests in a "batch" and completes demand analysis and schedule modifications prior to the actual scheduling. Much batch processing may be handled through the mail.

Open Registration - takes place just prior to the beginning of classes. It is used primarily by the student unable to advance register or forced to change advance registration.

Late Registration - takes place during the first few days after classes have begun. The processes are generally those of open registration. Both the standard allowable time and a standard penalty fee are set for late registration.

Program Adjustment/Drop and Add - begins immediately after the end of advance registration and continues until the close of late registration. This process accommodates the student's need to alter or adjust his/her schedule of classes.

Flexible Entry/Flexible Exit Program - allows the student to enroll in individually-paced courses at any time or on fixed dates throughout the term.

B. Purpose

The purposes of the Student Registration component are:

1. To provide the student with an "ideal" conflict-free schedule of classes.
2. To insure the utilization of the institution's educational resources.
3. To minimize inconvenience and wasted time for students, faculty, counselors, and administrators.
4. To produce accurate and complete data as needed for appropriate personnel, students, faculty, counselors, administrators, and outside agencies.
5. To offer sufficient credits for graduation in a reasonable length of time.
6. To provide equitable scheduling for both students and faculty.

C. Policy Questions

1. What mix of registration procedures will provide the most efficient and cost-effective total registration process?
2. Will students be required to register for a set schedule of classes with specific needs by the institution?
3. Will students be permitted to choose specific faculty/instructors?
4. Will students be able to select individual sections from a multiple section menu?
5. Will preference be established based on student classification (i.e., new/returning or freshmen/sophomore)?
6. Will counseling or faculty advising be required or optional?
7. Will assessment/placement testing be required or optional?
8. Will deferred payment options be provided?
9. Will a student be able to maintain simultaneous registration for more than one term at a time?

II. OUTPUT

The following reports may be part of the Student Registration component:

A. Student Class Schedule

A receipt document confirming the student's registration in a class for a given academic period of enrollment. The document should include the following:

All student sections
Identification of repeated courses
Identification of duplicate course registration

Student compliance with pre-requisite and co-requisite courses
Registration into restricted admission program
Student registering with financial obligations
Student registering with academic restrictions
Student registering for courses not in his/her stated educational plan.

Provided to the student.

Provided before fee payment.

Print format and on-line.

B. **Schedule Mailer**

Registration confirmation in a mailable format. The document should include the same information as the Student Class Schedule described above.

Provided to students registering by mail, phone, or any other registration processes that are not in person.

Provided on a daily or weekly basis with sufficient lead time to permit students to pay for classes before the start of the academic period of enrollment.

Computer printed document in a self-mailing format.

C. **Class Lists**

Listing of all students registered for a given class section. The document should include the following:
Course name and number
Instructor's name
Room
Credit hours
Meeting times
Alphabetic listing of students
Name, ID numbers, phone numbers, registration status (active, dropped, financial aid, veteran, etc.)

Provided to instructional faculty, departmental administrative offices.

Provided to the faculty prior to the first day of classes with additional revised class lists consistent with a flexible calendar.

Print format, with on-line access by departmental offices.

D. **Final Grade Roll**

Roll used to transmit academic grades in a machine readable format, using the institution's approved grade symbols A, B, C, D, F, etc. The document should include the following:
Course name and number
Instructor's name
Room
Credit hours
Class meeting times
Alphabetic listing of students
Student ID numbers.

Provided to instructional faculty and those personnel actually updating the student's records.

Printed two weeks before the end of the enrollment period.

Machine readable optically scanned or optical character recognition document.

E. **Open Section Report**

Listing by department of all sections that have slots available.

Provided to registering students, counselors/advisors, and administrators.

Provided on a demand basis as scheduled by the registration office: weekly at the beginning of registration and daily or twice daily at the end of registration.

Print format, possibly in the same format as the institution's printed class schedule.

F. **Student Enrollment Report**

Statistical report of student enrollment by FTE by pre-defined categories of enrollment. Report includes unduplicated headcount and/or FTE reporting by campus, day, evening, weekend, on-campus, off-campus, academic departments, etc.

Provided to academic line administration, educational research, and development department.

Provided daily. On-line format.

G. Enrollment Summary

A listing of enrollments for each instructional unit by individual sections which can be aggregated upward by course, department, campus, and/or other pre-determined educational units. The documents should include the following:

- Student enrollment by section
- Percentage of capacity
- Percentage of budget
- Remaining capacity
- Percentage of room capacity.

Provided to academic line administrators.

Provided on demand throughout the registration period.

On-line, with the capability to prepare batch hard copy.

H. **Student Grade Mailer**

A computer printed self-mailing grading document mailed directly to the student. The document should include the following:

- Student name
- Student ID number
- Mailing address
- Term (semester)
- Grades by individual section
- Term GPA
- Term hours earned and attempted
- Cumulative GPA
- Cumulative hours earned and attempted
- Academic status

Provided to enrolled students, grading personnel.

Provided at the conclusion of standard academic terms and/or special academic terms. The system should be able to generate grading by selected academic sections.

Computer printed document in a self-mailing format.

III. DATA ELEMENTS

Data elements required to generate the previously noted output/reports are:

- Name
- ID Number (SSN)
- Address
- Telephone Number
- Major/Program of Interest
- Veteran Status
- Senior Citizen Information
- Birth Date
- Sex
- High School Attended
- Previous College(s) Attended
- Citizenship
- Residency
- Ethnicity
- Counselor/Advisor Code
- Course(s) Student Enrolls In
  - Instructor's Name
  - Room Number
  - Building
  - Class Meeting Times
  - Credit Hours
  - Pre-requisities and Co-requisities
  - Class Enrollment Maximums
- Academic Standing

ACADEMIC ALERT MONITORING

I. INTRODUCTION

A. Definition

An Academic Alert Monitoring component is a computer-assisted mechanism for evaluating the student's academic progress and attendance at a given point during a term, a method by which to provide the student information about deficiencies, suggestions for improvement, and areas on the campus where help is available. It also provides end-of-term standards of academic progress information.

B. Purpose

The purposes of the Academic Alert Monitoring component are:

1. To inform the student of within term progress in all courses.
2. To inform the student of attendance as it relates to within term progress.
3. To refer the student to specific help available on the campus.
4. To provide statistical information about within term progress of the student as compared to end-of-term progress after intervention strategies are used.
5. To notify the student at the end of the term of his/her standing measured against the college's standards of academic progress.

C. Policy Questions

1. What are the criteria for satisfactory within term academic progress?
2. What are the criteria for attendance as related to midterm academic progress?
3. What is the method of notification and to whom?
4. Are adequate programs available to help the student overcome deficiencies?
5. What are the end-of-term standards of academic progress?
6. Are within term grades required? How early?
7. Will an evaluation be used to determine program effectiveness?

II. OUTPUT

The following reports may be part of the Academic Alert Monitoring component:

A. Mid-term Academic Alert Letter

Computer generated letter indicating mid-term progress and/or attendance.

Provided to students.

Provided at the midpoint of each term.

Computer printed document in a self-mailing format.

B. Mid-term Academic Alert Statistical Analysis

Analysis of student progress listing attributes that may affect success during the term.

Provided to administrators and faculty.

Provided when academic alert letters are processed.

Print format.

C. End-of-Term Standards of Academic Progress Information

Data mailer informing the student of standing under the institution's standards of academic progress indicating interventions available for future term help.

Provided to students.

Processed at the end of each term after grades are processed.

Print format.

D. **End-of-Term Standards of Academic Progress Statistics**

Statistical information on the student's current term academic standing, changes in student's status from one term to another, and statistics on the student who may be registered for more credits than allowed for a particular Standard of Academic Progress category.

Provided to administrators and faculty.

Provided after standards are recalculated each term based upon grades processed.

Print format and on-line.

III. DATA ELEMENTS

Data elements required to generate the previously noted outputs/reports are:

- Name
- Address
- ID Number (SSN)
- Current Course(s) Enrolled In
- Major/Program of Interest
- Course Withdrawal Information
- Type of Advisement - Faculty or Self
- Counselor/Advisor
- Native Language
- Class Type - Courses of Outreach; Courses Through Media; Short-term
- Disabilities
- Citizenship
- Financial Aid Status
- Mid-term Grades
- ACT/SAT Scores
- Assessment Test Scores (reading, writing, math)
- Progress Check from Faculty
  - Performance (satisfactory, improvement needed, no evaluation)
  - Attendance (satisfactory, improvement needed, no evaluation)
- Academic Standing Code
- GPA

I. INTRODUCTION

A. Definition

A Degree Audit component is a computer-assisted mechanism for determining student progress in satisfying established academic goals while enrolled at the college. This is a general program device to determine if a student is satisfactorily completing a degree or certificate intention. The Degree Audit component matches a student's major against courses completed, currently enrolled courses, or preregistered courses for a future term. The Degree Audit component has the capability of handling multiple sets of requirements in either actual or hypothetical situations, e.g., modeling a student's courses against several majors within the college.

The Degree Audit component is designed to graduate automatically a student if he/she is eligible to receive a specific degree or certificate, place the graduation remark on the electronically stored transcript, and also notify the student that graduation requirements have been satisfied. If the student is not eligible to graduate, the Degree Audit component provides notification of the reasons.

Progress reports should also be available indicating student eligibility to graduate. This progress report can be further subdivided by student characteristics to determine if there are differences in graduation notes for subcategories of the community college population. Such monitoring will enable counselors and advisors to assist the student who is not completing his/her educational objectives in a timely and satisfactory manner. An integral part of the Degree Audit component is a method to provide course equivalency which equates incoming transfer courses to courses currently offered in the institution.

B. Purpose

The purposes of the Degree Audit component are:

1. To inform the student of courses that are needed to graduate from the institution.
2. To notify the student when enrolled in courses which are not satisfying educational objectives (quality control in academic advisement).
3. To clear students automatically for graduation and reduce the labor involved in status checks.
4. To monitor special enrollment status, i.e., financial aid, veterans, international students, athletes.
5. To provide a document on the method the institution uses to equate incoming transfer courses.

C. Policy Questions

1. What are criteria for athletic eligibility?
2. What are criteria for international student progress?
3. What are criteria for financial aid eligibility?
4. What are criteria for veteran progress?
5. What are requirements for obtaining more than one degree?
6. What is the policy that students follow in attendance for a minimum number of terms based on certain catalog/year requirements?
7. What are substitution and repeat policies?
8. What is the transfer credit policy for incoming students?
9. How will conversion be made between quarter and semester hours to satisfy graduation requirements?
10. What medium will be used to deliver Degree Audit reports to students?
11. If a student changes majors, which program outline or combination of outlines will be used for graduation purposes?
12. What audio meetings, letter exchanges, etc., with institutions are necessary to be certain the college is correctly using transfer-in courses to meet graduation requirements?
13. How will courses be counted for double majors, minors, multiple degrees, etc.?

II. OUTPUT

The following reports may be part of the Degree Audit component:

A. Degree Audit Report

Listing of graduation requirements satisfied and those still unfinished. Includes an indication of courses completed to satisfy a graduation requirement area and specific courses still needed to satisfy the area and/or overall graduation requirements for the term.

Provided to student.

Provided on request.

Print format.

B. Progress Report

Numbers of students eligible to graduate at a specific point in time or at the completion of the term. This includes:

- Eligibility for financial aid
- Eligibility for athletics
- Veterans Administration status.

Provided to college staff, faculty, and administrators.

Provided when Degree Audit file is updated.

Print format.

C. System Monitoring Report

A report of errors or inconsistencies found in degree audit file processing.

Provided to college staff, faculty, and administrators.

Provided when Degree Audit file is updated.

Print format.

D. Data Mailer

Mailers indicating courses that the student is currently enrolled in but that are not needed for the degree, indicating eligibility to graduate for the student submitting a graduation application, indicating courses not in program for veterans.

Provided to the student.

Provided before advisement period begins.

Print format.

E. Program Outline

Current printed program outlines from curriculum files.

Provided to the student.

Provided before advisement period begins.

Print format.

III. DATA ELEMENTS

Data elements required to generate the previously noted outputs/reports are:

- Name
- Address
- ID Number (SSN)
- Previous and Current Course Information
  - Grades
  - Repeated Courses
- Major/Program of Interest
- Date of Admission
- Course/Catalog Information
  - Pre-requisites and Co-requisites
  - Equivalent Courses
  - Substitutions and Waivers
- Graduation Requirements
  - General AA
  - Technical/Occupational Degrees
  - Certificate Programs
- Graduation Application Information
  - Diploma Name
  - Reasons for not Graduating
  - Candidate Year/Term
  - Degree Earned
  - Courses not Needed for Degree
- Custom Programs Satisfying Individual Nondegree Goals

TRANSFER PROGRAM REQUIREMENTS

I. INTRODUCTION

A. Definition

A Transfer Program Requirements component is a computer-assisted mechanism for determining courses to be taken as part of degree work which are suggested or required for transfer in a particular major by the several institutions to which the majority of students will be transferring. An integral part of the transfer program requirement is to provide the vehicle for a community college course to satisfy a transfer requirement at the transfer institution, even if an exact equivalency does not exist.

B. Purpose

The purposes of the Transfer Program Requirements component are:

1. To provide program transfer information to the student by major for the several institutions that are frequently transferred to/from the community college.
2. To inform the student when enrolled in a course that is not required for the degree and/or not required as part of a major at the institution where he/she plans to transfer.

C. Policy Questions

1. What transfer program agreements must be reached by major with each university or through a state-wide compact?
2. What medium will be used to deliver the Transfer Program Report to students?

II. OUTPUT

The following reports may be part of the Transfer Program Requirements component:

A. Student Transfer Report

This report indicates the courses completed, currently enrolled in, or preregistered for in a future term to satisfy specific transfer program requirements for a particular major at a university. This information can be provided in a grid format with institutions listed across the horizontal axis and courses required or suggested for transfer as part of the elective and general education program listed on the vertical axis. A grid system of "R's" and "S's" with some footnotes can then be used to describe differing program requirements for the several transferring institutions.

Provided to the student.

Provided on a regular schedule.

Print format and on-line.

B. Program Monitoring Data Mailer

Notification to the student who is enrolled in a course that is not needed for transfer and/or graduation at the community college.

Provided to the student.

Provided after the student enrolls.

Print format and on-line.

C. System Monitoring Report

Alphabetical course listing for all majors indicating the university where the course is required or suggested for transfer.

Provided to college staff, faculty and administrators.

Provided on request.

Print format.

III. DATA ELEMENTS

Data elements required to generate the previously noted outputs/reports are:

- Name
- Address
- ID Number (SSN)
- Major/Program of Interest
- Previous and Current Courses
  - Grades Earned
  - Repeated Courses
- Transfer Program Information
- Courses Required for Transfer by Major to a Particular Institution
- Institution to Which the Student Wishes to Transfer
- Catalog/Course Information

STUDENT FOLLOW-UP

I. INTRODUCTION

A. Definition

A Student Follow-up component is a computer-assisted mechanism for determining the progress of students who have met stated goals after they have left the institution—either after having completed formal degree or certificate requirements, and/or having been placed in a job, or having been determined to have achieved stated individual goals. A Student Follow-up component is distinct from a student tracking system for determining course and program completion/attrition rates or variously defined "success" rates for students enrolled in the institution or for students determined to have left (or stopped-out) before completing programs or achieving stated goals.

A Student Follow-up component depends upon a comprehensive student data base for initial identification of students to be followed and for data elements needed to initiate follow-up contacts. However, a Student Follow-up component may be otherwise functionally independent of the main student information/student data base system.

B. Purpose

The purposes of the Student Follow-up component are:

1. To collect evaluation information from former students and their employers or their transfer institutions regarding program strengths, weaknesses, and adequacy of preparation for employment or transfer.
2. To collect and maintain systematically data concerning the success/history of student completers of various college programs for purposes of accountability with key external constituencies (i.e., state boards, legislators, taxpayers).
3. To satisfy state reporting requirements, especially with respect to vocational program funding.
4. To identify prospective employers of vocational/occupational program completers and to recruit these for service on program advisory committees.
5. To identify major transfer institutions and to develop and maintain articulation agreements with these.
6. To maintain and update accurate information with which to develop/maintain an active alumni association.

C. Policy Questions

1. What will be the location/responsibility of the student follow-up function?
2. Will follow-up data affect curriculum/instruction development and evaluation?
3. How will students identify programmatic intentions and certify program enrollment?
4. Can programs, program requirements, and program exit competencies be specifically defined?
5. How will "student completion" be institutionally defined (especially to distinguish completion from attrition, stop-out, etc.)?
6. Will state government agencies provide feedback to facilitate follow-up processes?
7. How long will the institution continue to track students in the follow-up process?

II. OUTPUT

The following reports may be part of the Student Follow-up component:

A. Program Completion Status Inquiry

Listing of students enrolled during the current term indicating enrollment in a program or program-related individual goals for each specific program.

Provided to program instructors/coordinators/directors to verify student enrollment intent and to update completion status as institutionally defined.

Provided during each term for reporting by instructor/director/coordinator upon completion of the term.

Print format.

B. **Semester Completion Report**

Listing of students identified as having completed the program during the most recent term, completion status, current address/phone number, future career/educational intention and various demographic and academic data by program.

Provided to program coordinators/directors, academic administrators, etc., to provide the basis for program completer files and the follow-up process.

Provided after the completion of each term.

Print format.

C. **Academic year Completion Report**

Non-duplicative listing of student completers during the academic year and a statistical summary of term completion reports for the institution, including number of completers by program, academic record summaries, future career/educational intentions, etc.

Provided to institutional administrators for purposes of internal and external accountability (including state reporting) to provide historical trend comparisons, and to initiate annual student follow-up processes.

Provided once a year upon completion of the academic year.

Print format.

D. **Mailing Labels/Control List**

Non-duplicative list of the names, addresses and telephone numbers of all identified program completers during the most recent academic year and corresponding sets (2) of mailing labels.

Provided to the institution office/administrator assigned to conduct the follow-up process.

Provided once a year upon completion of the academic year.

Print format.

E. **Student Follow-up Report**

Statistical summary of the results of follow-up contacts with former students by mail or telephone, including, at a minimum three subgroups of students that may be treated in separate reports:

Vocational/Occupational student follow-up report
Transfer student follow-up report
Follow-up report of students with stated individual goals
Employer follow-up report
Transfer institution follow-up report.

Provided to appropriate institutional personnel for evaluation.

Provided once a year approximately 4-6 months after follow-up is initiated by Academic Year Completion Report and after follow-up processes have been completed.

Print format.

III. DATA ELEMENTS

Data elements required to generate the previously noted outputs/reports are:

Name
Address
ID Number (SSN)
Major/Program of Interest
Course Schedule
Future Career/Educational Intention
Student Demographic Data upon Completion - Age, Sex, Birth Date, etc.
Previous Education/Employment
Completion Status (degree, certificate, GPA, courses taken, individual goal achievement, etc.)
Academic Record Upon Completion (GPA, courses, etc.)
Job Placement by Institution

Term of Completion
Employment Status
- Employer Name/Address/Telephone
- Job Title
- Starting Salary/Current Salary
- Job Satisfaction
- Job History Since Completion

Educational Enrollment Status
- Institution
- Enrollment Intention
- Academic Performance Measures

Educational History Since Completion
Former Student Evaluation of Preparation Provided by Original Institution
Employer Evaluation of Preparation Provided by Institution

HARDWARE CONSIDERATIONS

A frequent temptation is to make decisions about computer hardware prior to software and system design considerations. In this section hardware alternatives will be reviewed, but only after repeating that **the key message** is "software first."

In the development of computerized student information systems, it is essential to have software identified before hardware decisions are made. Sources may be packages sold by software companies, or sets of programs exchanged with other colleges, or an internal programming staff capable of developing such systems. The chosen source will narrow the hardware options at most colleges. In addition, the common practice of sharing administrative and instructional uses also influences the decision to be made in the selection of hardware.

The other caution is not to underestimate rapidly changing technology. Hardware prices are continuously declining while speed and capacity are similarly increasing. These trends discourage any definitive statement or approaches to problem-solving. Understanding the current state-of-the-art in computer hardware is akin to aiming at a moving target.

Several strategic considerations should be evaluated and discussed:

1. All comprehensive student information systems to date have been created for main frames or large mini computers. The degree audit systems run only on very large systems. History is on the side of the larger computers. Proponents of the smaller computers (micros, personal computers) are counting on future software and further technological improvements.

2. A comprehensive student information system requires many large files for such data as curriculum requirements, course matters, student demographics, transcripts, financial aid, and job placement. A computer system that provides for the integration of these files would eliminate unnecessary duplication or redundant data. Any combination of data could be easily obtained and cross-referencing would be possible. Hard disk hardware allows quick, simultaneous access to multiple files, and Data Base Management Systems (DBMS) or the Indexed File System (ISAM) can integrate files. The newest approach to designing an integrated system—"relational data base"—may be helpful.

   The disk hardware must allow quick simultaneous access to these multiple files. In some programs, it is necessary to access many of the files during the preparation of one report. The Data Base Management System structures (DBMS) or the Indexed File System (ISAM) will provide that capability. The concept of integration can be accomplished with these two types of file structures. Redundant data are kept at a minimum and pieces of data can be quickly obtained. Again, the relational data base approach has merit in designing new systems.

   The floppy disk of the smaller computers certainly cannot handle the volume of information required in the system. In fact, it takes a substantially large hard disk system to support a computerized student information system. Be aware that any intended use on a personal computer will require a hard disk of at least 100 million characters for even the smallest colleges. Fortunately, that disk with such capacity is just becoming available at a reasonable cost for use with smaller computers.

3. An on-going debate continues in regard to the merits of microcomputers versus the larger computers (minis or main frames). There are enthusiastic supporters of both types. The debate is best answered by designing a system that is a combination of both. The concept of distributed computing or networking is now a cost effective answer.

   Distributed computing is built around a network of large and small computers linked together. This network can be a telephone line, terminal line (RS232 line), or a LAN (Local Area Network such as ETHERNET). There is great progress in the development of these networks. They permit the rapid and easy exchange of data among various types of computers. Activities such as word processing can be done on a unit operating independently and thus not consume the large computer resources. However, when needed, these documents can be transferred to the network for processing.

   Distributed computing has been a buzz word for many years. But it now appears to be the direction for the development of student information systems. Terms such as "uploading" and "downloading" of data describe a process in which needed data are transferred among the computers. This method of processing combines the advantages of using the larger computers and the microcomputers. It has a larger capacity system for the large volume data bases, and it also has the convenience of the smaller systems which are in the control of the user.

4. The issue of on-line versus batch processing needs to be evaluated. Traditionally, student information systems were developed in a batch mode with printed output as a primary source of information. Almost all new systems being developed today are in an online form in which the information is displayed on a monitor. This should be the direction of all new systems designed. However, there will be some reports, such as the student report card, that will still be created in a batch mode.

   In the degree audit system, most of the systems were built around the batch mode of processing because of the heavy computing requirement. Today, it is possible to design these systems in an online mode. The programming for online systems has been made considerably easier with new software tools and faster computers.

   When batch reporting is used, great care must be taken in using quality printers and in designing reports that are easily read by the student or staff member. A major breakthrough is occurring in the cost of laser printers. These devices are now cost effective and can create high quality print with graphics that make previously cluttered documents much more readable. The laser printer should be part of all future planning for student systems. If the systems require mailing and use of mailer forms, a high speed, heavy duty printer is also needed. The printers that are now available on the various small systems have extreme difficulty printing data mailers. The forms are too thick and the printers work too slowly to make the smaller printers effective.

5. Another emerging technology is the use of the telephone as an input device. This idea started with telephone registration, a process that is now implemented at many colleges. This system consists of people using their own phones to dial the college, then the telephone operator and the CRT operator become the same person. The operator puts in the course request for that student. Equipment is now available that permits the students at their touch tone home telephones to key in course requests and have the computer give back a voice response. This eliminates the operator bottleneck and will be a common method of registering in the very near future.

6. Optical scanning is a popular input source for student information systems. The collection of grades and test scores are very common applications. The use of scanning to collect miscellaneous student demographic data is increasing.

7. The terminal, or micro, or word processor is now recognized as a work station. This implies multiple uses. This work station is a terminal where a student registers. It functions as a word processor; it communicates electronic messages to students and staff; it may present data in color and graphic form; it may access an external data base, such as the library.

Certainly there are many hardware options available. There is not one right configuration or vendor. The capabilities of the micros have been oversold, but with the rapidly changing technology, they may well live up to their promise soon. On the other hand, in their wish to achieve control, the larger systems have often been overprotected by computer services operations at the college. A balanced approach or distributed computing appears to be an excellent compromise.

This networking of the hardware system encourages the integration of data and functions. Student information is more easily retrieved providing more complete data elements. New software aids permit that data to be manipulated or displayed in a "friendlier" fashion. The work station of the operator can now be a home base where more functions are performed.

PREDICTIONS FOR THE FUTURE

Contemporary society has been characterized the "information society" for reasons both numerous and profound. The capability of the computer to collect, store, retrieve, and analyze data with speed and accuracy has radically changed concepts of student recordkeeping. Electronic communication has begun to revolutionize processes of providing information to students and staff. Very large amounts of data can be collected for each student, analyzed, and interpreted individually. Individual diagnoses and prescriptions can be developed. However, the problems of accessibility and privacy are unresolved. Recognizing that this is a period of radical social and technological change, we know that what is proposed today will not be a permanent system. It is a first step in a journey with a destination but with a path undecided. The goal is to provide students and staff with the information needed to make good decisions about education. Technology has provided a set of new tools and methods. These tools and methods will continue to expand in power, complexity, portability, and sensitivity.

The ability to make use of the new information technology will depend on flexibility, adaptability, willingness to risk, and the availability of resources to support change. Risk-taking not only involves a commitment to what is known today, but also to a plan for the future. "The prophesying business is like writing fugues; it is fatal to everyone save the man of absolute genius," said H.L. Mencken. With that formidable warning in mind, predictions for the future are listed below. Since no absolute genius has been discovered among us, our vision of the future is offered in the spirit of speculation, not revelation.

- Each person will have a portable computer/terminal that will be programmable, have storage capacity, and will provide access to data banks.
- Data will be coded for limited accessibility to insure privacy of information.
- Data banks will be integrated and interactive.
- The function of providing information to students will not be a human task. Student personnel workers will not spend their time handling information in ways that are done more efficiently by computer.
- Students will not be **required** to come to the campus for information exchange. Other reasons for their presence will become paramount, including social and recreation experiences.

SPECIAL PROJECTS AND IDEAS FOR FUTURE DEVELOPMENT:

For Assessment, Advisement, and Counseling:

As computer technology and test item development continue to advance, it will become possible to use the computer to create measurement experiences tailored to the specific needs and goals of the individual. Offered either at the campus or through a telephone mode to the home, the data gathered will be instantly entered into a data base and communicated to the participant, complete with recommendations.

Based on student demographic information, individually prescribed activities and services will be provided to the students at the time of admission or during advisement.

Optical scanning, character recognition, and voice actuated devices will contribute to ease and simplicity of use.

A credit card system will record each student's use of services and records, which will allow analysis of the level of activity in each area.

For Registration:

The technology is now available for major changes in the way students are registered. Students will be able to conduct most of the tedious, but necessary, interactions with the college from the comfort and convenience of home. Each student, through a personal computer, will be able to communicate with the college on all routine information-sharing matters. The future registration system will allow a student to change his or her registration for any future enrollment period from home without the necessity of traveling to the campus, standing in long lines, and interacting with beleaguered and frazzled clerks. The student's schedule will be "mailed" for confirmation. The mailing, however, will not use a U.S. postage stamp and travel by mail truck. The student's schedule will be electronically mailed to the student's computer mailbox.

To complete the intended enrollment, the student will pay the appropriate fees. In this case, a check will not be mailed to the college. The student will simply and easily transfer funds from the student's bank to an appropriate college account, thereby completing registration for the next period of enrollment.

For Progress Monitoring:

Students enrolled at the community college will either own or check out a microcomputer. This microcomputer will serve as a terminal for accessing the college data banks and will be plugged in at many locations across the campus.

All grades and attendance reports will be stored in the data bank. When the student accesses the main frame, a message will appear indicating the lack of progress or attendance in a specific course with a message from the instructor to make an appointment for a conference or suggestions for help available through support systems on the campus. Failure to access the computer will, after a period of time, automatically generate a letter describing the problem and suggesting alternatives. Counselors and advisors will also be notified of the problem. The Degree Audit system of the future will allow a student to check current progress toward any degree or program of study.

A program will be available that produces a personal schedule based on the class schedule and parameters given by the student, including desired days and hours, instructors, type of class (self-paced, TV, off-campus, honors, etc.) and program or degree requirements. If desired courses are not available, the computer will retain the information. Curriculum managers will be able to modify the course schedule based on student needs.

Equivalency information will be updated frequently and will be available to staff and students through the computer. Students' records will be online and available to upper division institutions. The universities can use this information for program planning and can contact prospective students about admissions requirements, advisement, housing, etc.

For Follow-up:

Updating former students' addresses is the most troublesome problem associated with follow-up studies. To help with that problem, a birthday card will be sent each year to all former students, containing a personal message and requesting the return of an information card. Such a system will collect information about students on a yearly basis and will also keep them informed about college programs. The quality of student follow-up at upper division institutions will improve when transcripts and other student records are transmitted electronically. Another aspect of student follow-up of growing importance to community colleges is an alumni program, which will be maintained on a separate microcomputer.

Artificial Intelligence:

The possibilities discussed above are based on "fourth generation" computers, which are essentially counting and calculating machines. The new "Fifth generation computers," or artificial intelligence, will not simply be smaller, faster, more powerful versions of the fourth generation. They will be able to do more than count and calculate: they will be able to think. They will shift away from data or information processing to symbolic manipulation and inference. They will be able to pare, shape, interpret, select, and transform information into knowledge.

It is possible that reasoning machines will think faster and deeper than humans. It is possible that they will think in very different ways from humans. It is possible that they will discover new knowledge. If such machines become available to us, as predicted, in the 1990's, they will revolutionize our society and with it, our educational system.

CONCLUSION

The development of a comprehensive student information system will consume a major share of institutional resources: time, energy, and dollars. Even if a decision is made to purchase or adapt a pre-existing system, staff will spend many hours in study, comparison, and modification. In return for the investment, the college can expect to have a dependable and efficient program that is used extensively and effectively by students and staff.

From colleagues who have been active in the development and use of such programs, a list of recommendations has been collected. The list is offered with the hope that others can benefit from their experiences.

- Designate one leader of the project, a professional who has the authority to make decisions after hearing all sides of an issue.
- Expect the chief executive officer to designate the leader and establish the priority of the project in writing.
- Develop timetables for completion; publish the project schedule.
- Allocate resources needed to complete the project on time. Set aside contingency funds for unforeseen delays and difficulties.
- Develop mutual respect and understanding between the users and the data processing specialists.
- Base data elements and reports on user needs and expectations.
- Include students as users of the student information system.
- Plan to document the system thoroughly, both from a technical standpoint, and in the form of a user's handbook or manual. It is not likely that a single document can serve both functions.
- Plan to hold staff training sessions when the system and the handbook or manual are ready. Test the system thoroughly and use staff input to make revisions.
- Plan for on-going maintenance and revision of the system. Remember that handbooks will need to be revised or updated.
- Keep the system flexible to meet shifts in enrollment patterns.
- Buy hardware that is expandable in power and function, so that the system can grow as needs increase or as new needs develop.
- Plan for shifts in staffing that should result from the new system.
- If you decide to buy software instead of writing your own, remember to:
  - Survey other institutions, but develop a prospectus based on your own needs, not others' systems.
  - Hire a consultant if in-house expertise is not available. Do not hire a vendor to fill this role.
  - Recognize that an in-house "champion" must emerge to push the project along.

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APPENDIX I

MATRIX

This matrix was devised to show how the same data elements are used in the five subsystems of the student information system. It also shows which areas may logically collect, use, and maintain each data element.

While a list of data elements appears for each student information component, there is considerable overlap. This matrix may help reduce possible duplication of effort. Responsibility for maintaining files should be designated.

The matrix includes information about students — the individual student's master record. Three other areas are included as additional but separate lists of data elements. They are:

- the course and degree system, with the alphanumeric course list and graduation requirements
- the articulation system
- the student follow-up system.

Key: C = Collects, inputs, uses, updates
U = Uses
M = Maintains

Data Elements	Recruitment, Admission, Document Control	Assessment, Advisement, Counseling	Registration and Records	Student Progress Monitoring, Degree Audit	Follow-up, Job Transfer, Alumni
ID INFORMATION					
Name	C	U	M	U	U
ID Number (SSN)	C	U	M	U	U
Address	C	U	M	U	U
Telephone Number	C	U	M	U	U
DEMOGRAPHIC INFORMATION					
Birth Date	C	U	M		U
Sex	C	U	M		U
Ethnicity	C	U	M	U	U
Native Language	C	U		U	U
Citizenship	C	U	M		
Financial Aid	C	U	M	U	U
Scholarship	C	U	M		
Loan	C	U	M		
Grant	C	U	M		
Veteran Status	C	U	M		U
Disability	C	U	M	U	U
Employment Status	C	U	M	U	U
Name of Employer	C	U	M		U
Work Hours per Week	C	U	M		U
Job Title	C	U	M		U
ACADEMIC RECORD					
High School Graduate	C	U	U		
Date of High School Graduation	C	U	U		
High School GPA	C	U	U		
Name of High School Attended	C	U	U		
Location of High School	C		U		
ACT/SAT Scores		C		U	
Assessment Test Scores		C		U	
Math		C		U	
Writing		C		U	
Reading		C		U	
GED Date	C	U			
GED State of Conferral	C	U			
College(s) Attended	C	U	U		
Hours Completed	C	U	U		
Major	C	U	U		
GPA	C	U	U		
Courses Completed & Grades	C	U	U		
APPLICANT RECORD (NEW STUDENT)					
Date of Admission (Term)	C			U	
Admission Status	C				
Residency Information	C		M		
Assessment Complete		C			
Advisement Complete		C			
Type of Advisement		C		U	
Counselor/Advisor		C	M	U	
Registration Permit Issued		C	U		
Date/Time		C	U		
Potential Enrollment Term	C	U			
Recruitment Method	C	U			
Information Sent to Student	C	U			
Major/Interest Area	C	U	U	U	U

Key: C = Collects, inputs, uses, updates
U = Uses
M = Maintains

Data Elements	Recruitment, Admission, Document Control	Assessment, Advisement, Counseling	Registration and Records	Student Progress Monitoring, Degree Audit	Follow-up, Job Transfer, Alumni
APPLICANT RECORD (NEW STUDENT) cont					
Special Interests & Recognitions	C	U			
Application Documents Required	C				
Type of Document	C				
Date of College Receipt	C				
Goal Intent	C	U			
Senior Citizen Information	C		U		
Emergency Information	C				
Special Needs	C	U			
Enrollment Plans	C	U			
Day or Evening (or both)	C	U			
Full-time or Part-time	C	U			
Degree or Certificate Desired	C	U			
Transfer Plans	C	U			
STUDENT RECORD					
Scholastic Standing		U	U	C	
Disciplinary Standing	C	U	U	U	
Financial Standing	C	U	U	U	
GPA	C	U	U	U	
List of Courses (Current and Previous)	C	U		U	
Course	C	U	U	U	U
Section	C	U	U	U	U
Instructor	C	U	U	U	U
Grade	C	U	U	U	U
Withdrawn	C	U	U	U	U
Incomplete	C	U	U	U	U
Repeated	C	U	U	U	U
Pre-registered	C	U	U		
Last Term Attended	C	U			
Registration Permit	C		U		
Date/Time	C		U		
EDUCATIONAL PLANS					
AA Degree or Certificate		C	U	U	
Non-degree		C			
Undecided		C			
Career Area		C			U
Transfer To:		C		U	U
Degree/Major		C		U	
Required Courses Completed		U	C	U	
Grades	C	U		U	
In Progress		U	C	U	
To be Completed		U		C	
Elective Courses Completed	C	U		C	
Grades	C	U			
In Progress		U	C		
To be Completed		U		C	
Substitutions/Waivers	C				
Courses Not Applied	C				
Graduation Status				C	
MIDTERM PROGRESS REPORT					
Course			C	U	
Section			C	U	
Instructor		U	C	U	
Progress (U/S)		U		C	
Attendance (U/S)		U		C	
Suggested Action		U		C	
Student Response		C			

COURSE AND DEGREE SYSTEM DATA ELEMENTS

ALPHABETIC AND NUMERIC COURSE LIST
- Current (date initiated)
- Past (date last offered)
- Pre-requisites and Co-requisites
- Equivalent Courses
- Credit Hours
- Substitution and Waivers
- Instructor's Name
- Class Meeting Times
- Room and Building
- Course Information
  - Numbers
  - Title
  - Type of Course

GRADUATION REQUIREMENTS
- General AA
- Technical/Occupational Degrees
- Certification Program
- Graduation Application Information
- Degree Earned
- Candidate Year/Term
- Diploma Name
- Reasons for not Graduating
- Courses not Needed for Degree

ARTICULATION SYSTEM DATA ELEMENTS

Transfer Institution
- Name
- Address
- Majors & Programs Offered
- Courses Required
- Electives Accepted
- Equivalencies
- Tuition Cost
- Residency Information
- Deadline for Application
- Articulation Agreement
- Student Services, Fees, etc.

FOLLOW-UP SYSTEM DATA ELEMENTS

Future Career/Educational Intention
Student Demographic Data Upon Completion
Completion Status (Degree, Certificate, "Marketable Skills", Individual Achievements)
Academic Record Upon Completion (GPA, Courses, etc.)
Job Placement by Institution
Term of Completion
Employment Status
- Employer Name/Address/Telephone
- Job Title
- Starting Salary/Current Salary
- Job Satisfaction
- Job History Since Completion

Educational Enrollment Status
- Institution
- Enrollment Intention
- Academic Performance Measures

Educational History Since Completion
Former Student Evaluation of Preparation Provided by Original Institution
Employer Evaluation of Preparation Provided by Institution

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